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Health Educ Behav 2010 37: 895 originally published online 27 October 2010
DOI: 10.1177/1090198110367876

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A Comparison of the Effectiveness of a Telephone Coaching Program and a Mail-Based Program

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Many health promotion interventions have been developed and tested in recent years. Practitioners and researchers must continue to explore how various program delivery modalities can be used effectively and efficiently to optimize program outcomes. A sample of 6,055 participants was drawn from 10 large employers. Participants self-selected into a mail or telephone intervention. This study compared the demographics of those who selected each modality and assessed differences in program success relative to the modalities chosen. Telephone participants were more likely to be older, female, and salaried. Telephone participants were also more ready, confident, and motivated to make a behavior change, when compared to those in the mail program. Researchers found both the telephone and mail programs to be effective in reducing participants’ health risk status, though the telephone program was slightly more effective. These findings demonstrate the importance of offering a variety of interventions when promoting healthy changes. More research is needed to investigate the role of participant choice and the combinations of learning experiences that best facilitate sustainable behavior change.

Keywords: health coaching; mail-based health intervention; health promotion

One time-honored definition of health education is that it is “any combination of learning experiences designed to facilitate voluntary adaptations of behavior conducive to health” (Green, Kreuter, Deeds, & Partridge, 1980). Many combinations of learning experiences have been developed and tested in recent years (Kreuter & Wray, 2003; Marcus et al., 2007a; Napolitano et al., 2008; Strecher, 2007; Terry, 2002; Van Wier et al., 2009), and innovations must continue given the dynamic nature of the...
environment in which health behavior changes occur (Chapman, Lesch, & Baun, 2007; Mettler & Kemper, 2005; Terry, 2003). Of particular interest to practitioners and researchers alike has been the comparative effectiveness of different health education modalities, such as face-to-face group programs, serial mail-based programs, Internet-based programs, and individualized health coaching. Along with questions about the level of intervention intensity needed to change target health behaviors have come questions about which modalities are most appropriate and effective given program budgets and goals and the particular attributes of a target population (Allen, Iezzoni, Huang, Huang, & Leveille, 2008; Heimendinger et al., 2005; Napolitano et al., 2003; Nitzke et al., 2007).

Numerous studies have shown that appropriately timed and targeted mail-based interventions using educational materials can have a significant impact on the recipients’ health knowledge, attitudes, and beliefs (Blalock et al., 2000; Grossmeier & Serxner, 2002; Jeffery et al., 2004; Serxner, Gold, Grossmeier, & Anderson, 2003; Terry & Pheley, 1993). Mail-based interventions can be as simple as a physician handing a patient a brochure or as comprehensive as a full self-study course in a self-care topic. Most mail-based programs are similar to the approach in the present study where participants are sent a series of related mailings over a number of weeks followed by a self-assessment or formal evaluation. For relatively basic health behaviors, well-designed educational mail-based programs have been shown to positively affect self-care decision making, such as seeing the doctor for a preventive exam (Mettler & Kemper, 2005; Terry, 1994), using home-based remedies for self-limiting conditions, as well as reducing unneeded clinical visits (Hibbard, Greenlick, Jimison, Capizzi, & Kunkel, 2001; Terry & Pheley, 1993). Such programs have proven effective in medical self-care of chronic conditions such as osteoporosis (Blalock et al., 2000), congestive heart failure (Serxner, Miyaji, & Jeffords, 1998), and Parkinson’s disease (Montgomery, Lieberman, Singh, & Fries, 1994) and also in the self-management of asthma (Burton, Schultz, Connerty, Chen, & Edington, 2001), arthritis (Fries, Carey, & McShane, 1997), diabetes (Gelfand, Geffken, Halsey-Lyda, Muir, & Malasanos, 2003; Oh, Kim, Yoon, & Choi, 2003), and back injury (Hazard, Reid, Haugh, & McFarlane, 2000).

Although limited, research has demonstrated that mail-based approaches are also effective in creating changes, such as improved physical activity levels (Castro, King, & Brassington, 2001; Marcus et al., 2007a) and reduced tobacco use (Strecher et al., 2005). Some studies have shown that mail-based approaches can support weight management (Gelfand et al., 2003; Goulis et al., 2004) but are less likely to be effective in obesity management than other alternatives, such as the more intensive onsite weight management programs or telephone-based weight loss programs (Ash et al., 2006; Jeffery et al., 2003).

Compared with the role of other more intensive intervention modalities, mail-based programs are appropriate when program goals are targeted (Jeffery et al., 2004). Similarly, this approach is most appropriate when the program needs to sustain educational messaging long term (Fries, Fries, Parcell, & Harrington, 1992), when cost-effectiveness is a primary consideration (Prochaska et al., 2005), when a target group is considered less motivated (Decker & Evans, 1989) or when moving a population to higher levels of readiness to change is a key goal (Marcus et al., 1998). Indeed, for some programs with very long-term goals or with target audiences at lower levels of readiness to change, mail-based programs may be superior to other more intensive interventions in achieving behavior changes (Decker & Evans, 1989; Fries et al., 1992; Sherwood et al., 1998). Research has also shown that the manner in which educational approaches are developed and delivered can impact their effectiveness.
materials are sent and received can have a positive impact on the effectiveness, particularly in eliciting goal behaviors (Terry & Healey, 2000).

Telephone-based health coaching programs have emerged over the past 15 years as a common adjunct or alternative to Internet- and mail-based health education programs. Telephone-based interventions have considerable variation in call frequency and duration but typically include 10- to 20-minute encounters between participants and health professionals over 3- to 9-month time periods. The greatest variability typically relates to call frequency with service offerings of anywhere from 1 to 20 calls. Studies show that telephone-based coaching is an effective behavior change intervention (Gold, Anderson, & Serxner, 2000; Marcus et al., 2007a; Saywell, Champion, Skinner, Menon, & Daggy, 2004). One review of telephone-based coaching programs concluded that a solid evidence base exists that supports such interventions for physical activity and dietary behavior change and that future research should focus on generalizability, program dissemination and behavior change maintenance (Eakin, Lawler, Vandelanotte, & Owen, 2007). There is some evidence suggesting that telephone-based coaching used in combination with another modality, such as the Internet, improves participant retention (Jeffery et al., 2003) and outcomes (Allen et al., 2008; Nitzke et al., 2007). Yet other studies have found no differences in effectiveness between programs that utilize a combination of modalities including telephone-based coaching compared to control groups (Castro et al., 2001; Marcus et al., 2007a).

Vale et al. found that telephone-based coaching was comparable to use of prescription drugs for managing lipids (Vale, Jelinek, Best, & Santamaria, 2002). Other researchers have presented evidence that telephone-based coaching can be superior to clinical visits, especially for supporting weight management (Gelfand et al., 2003; Goulis et al., 2004). Conversely, some study findings indicate that the impact of telephone-based coaching on patients’ success in weight management is minimal (Oh et al., 2003) and that face-to-face clinical encounters are better suited for tailoring the intervention to individuals’ personal needs for effective weight control (Jeffery et al., 2004). Still others conclude that the most effective approach involves combining telephone-based coaching and mail-based educational materials (Prochaska et al., 2005; Saywell et al., 2004). Castro and colleagues suggest that telephone-based approaches are most effective during the early initiation phases of an intervention whereas mail-based or Internet-based modalities are particularly effective during the behavior maintenance phase (Castro et al., 2001).

Recently, Project STRIDEx (Marcus et al., 2007a, 2007b) sought to identify the individual effects of a telephone-based and a mail-based health education program on physical activity. In this randomized controlled trial (RCT), both programs led to increases in physical activity when compared to a control group. Interestingly, and contrary to the authors’ stated hypotheses, the mail-based program outperformed the telephone-based program after 12 months.

Although often considered the criterion standard of epidemiological research, one inherent limitation of the RCT study design is that it only examines which intervention arm of the study is most effective relative to the other arms of the study. The RCT study design does not allow researchers to adapt the interventions to individual learning styles and demographic or psychosocial attributes, and thus researchers cannot address the important questions surrounding the most effective intervention approach for an individual at a given point in time. Project STRIDEx is one example of RCT research that shows that telephone-based and mail-based interventions can be effective in changing behavior. What remains unanswered is how researchers and practitioners can best use
telephone-based and mail-based interventions to increase the total amount of healthy behavior in the populations they serve.

Therefore, it is important to continue to explore how various program delivery modalities can be used in the most effective and efficient manner to optimize program outcomes. Continued study is needed to answer questions related to individual learning styles and/or psychosocial attributes of individuals and which type(s) of program delivery will have the highest probability for success among various populations. The interventions assessed in this study rely on individual participants to select a program based on their own learning preferences, psychosocial attributes, and interests. Using a recruitment method that enabled participants to self-select between a mail-based or telephone-based modality, this study compares the demographic characteristics of those who selected each modality and assesses differences in program success relative to the modalities chosen. As described above, previous research has shown that telephone- and mail-based interventions can reduce health risks. The primary aim of this study is to compare the risk profiles of participants who chose the mail-based modality against those who chose the telephone-based modality. Our second study aim is to assess the relative success rates between participants who chose the mail-based program and those who chose the more intensive telephone-based intervention.

METHOD

Design

This study relies on a pre–post study design to compare the effectiveness of a telephone-based health coaching program and mail-based program. Between-group comparisons are made between telephone-based health coaching (health coaching) program participants and mail-based (mail) program participants, as well as between health coaching and mail completers.

Sample

The study sample was drawn from 10 employers representing primarily large private- and public-sector companies that were clients of StayWell Health Management (StayWell®) and offered comprehensive worksite health management programs between 2004 and 2006. Of the original study pool of 198,163 employees, researchers identified 32,650 (16.5%) individuals who completed a baseline health risk assessment (HRA) and who were eligible for and registered in a targeted NextSteps® telephone-based health coaching or mail-based program. Eligibility for the programs was defined by number of health risks of an individual as identified on the HRA and was determined independently for each company. This sample size offered considerable demographic variation and statistical power for addressing our study questions even though the percentage of participants in the interventions is relatively small compared to what would be expected in any one worksite setting. The participation percentage is a function of the wide variation among companies relative to the level of risk used to determine program eligibility.

Of the 32,650 registrants, 27,268 (83.5% of eligible employees) initially registered in a health coaching program and 5,382 (16.5% of eligible employees) initially registered in a mail program. Employees were excluded from the analysis if they were eligible for and registered in a health coaching or mail program but subsequently transferred into an alternative program modality (e.g., online program) or program topic (n = 10,270) or withdrew.
their participation for any reason ($n = 8,406$). An additional 7,129 were excluded because they did not have a follow-up HRA, and 433 were excluded because they were currently active in a program at the time they completed the baseline measurement. Finally, 357 individuals were excluded from the study because they were still participating in the intervention at the end of the study period. The final study sample included 6,055 employees, among whom 3,536 (58.4%) were in health coaching and 2,519 (41.6%) were in mail; the average number of days between assessments was 1.17 years (427 days). The resulting sample sizes for the health coaching and mail programs were similar despite the initial recruitment pool differences. This is due, in part, to the transfers and retention rates for the health coaching program as described. The health coaching program had a lower retention rate, presumably because of the increased intensity of the intervention.

**Measures**

Self-reported data were collected using the StayWell HRA. The predictive validity of these tools has been established (Anderson, Brink, & Courtney, 1995; Brink, 1987; Goetzel et al., 1998; Smith, McKinlay, & Thorington, 1987). The HRA includes questions related to demographics, chronic conditions, health status, lifestyle health behaviors, and readiness to change for specific behaviors. The HRA was delivered both online and in traditional paper format. The HRA included 47 questions and used a combination of forced-choice ordinal and interval scale items to categorize data such as demographics, chronic conditions, lifestyle health behaviors, health care use, psychosocial factors (e.g., readiness to change, self-efficacy), and ergonomic issues.

Based on their HRA responses, employees were categorized as low, moderate, or high risk in 13 health behavior areas: alcohol, back, blood pressure, cholesterol, driving, nutrition, preventive exam compliance, physical activity, self-care, stress, tobacco use, weight, and well-being (depression). National consensus standards and other expert health guidelines (citations available on request) were used to classify health behaviors into risk scores consistent with evidence that the risk levels have been associated with coronary heart disease, health care costs, and productivity costs. For example, an employee is considered to be at low risk for a particular health risk factor if his or her risk was within recommended parameters or was nonexistent. Additional detailed information about risk definitions for the StayWell HRA has been recently published elsewhere (Riedel et al., 2009).

**Health Status.** Perceived health status was determined based on a single item on the HRA that was adapted from the SF-8 (Ware, Kosinski, Dewey, & Gandek, 2001). Derived from the longer 36-item instrument (Ware, Snow, Kosinski, & Gandek, 1993), the SF-8 is a multipurpose short-form (SF) measure of health status. Employees were asked to rate their overall health on a scale of very poor to excellent. Those who reported their health status as very poor, poor, fair, or good were considered as having low perceived health status and those who reported their health status very good or excellent were considered as having high perceived health status.

**Chronic Conditions.** Employees were asked to report if a doctor had told them that they had any of 18 chronic health conditions listed on the HRA (e.g., arthritis, asthma, cancer, diabetes type 1 and type 2, high blood pressure, heart disease, lower back pain, depression), with an additional item that allowed employees to report any chronic conditions not listed on the HRA. A total number of reported chronic conditions was calculated for each employee and then collapsed into a dichotomous variable to
differentiate between those who reported having no chronic conditions and those who reported at least one chronic condition.

**Health Risk Status.** Health risk scores were treated as dichotomous measures so that employees were considered to be either at risk or low risk for each health risk. A composite measure of lifestyle-based health risk status was also created for each individual by summing his or her at-risk scores across nine health risk areas. The four health risk areas excluded from the composite measure include blood pressure and cholesterol as well as preventive exam compliance and self-care because they are not necessarily lifestyle-based behaviors. Overall risk reduction was measured as the difference in the average number of risks between baseline and follow-up. Change in specific health risk areas was measured according to movement from one risk level to another risk level.

The primary outcome of interest was overall health risk change which was calculated as the difference between follow-up and baseline measures. Secondary outcomes included reduction in health risk in the specific areas for which StayWell provides targeted and tailored intervention programs including back care, blood pressure, cholesterol, nutrition, physical activity, stress, tobacco use, and weight. Health risk reduction was determined by comparing health risk levels at baseline and follow-up.

**Motivational Attributes.** Employees indicated their readiness to change as well as their confidence to change and importance of making a change in the eight health risk areas for which programs are offered. This study considered the readiness, confidence, and priority to change reported for the health risk area in which the individual chose to participate. Readiness to change is based on the five-stage transtheoretical model (Prochaska, Norcross, & DiClemente, 1994) of behavior change. Employees were classified into one of the five stages of behavior change, including precontemplation, contemplation, preparation, action, and maintenance, based on responses provided on the HRA. The items used to determine the stage of change asked individuals to indicate for each health risk area whether they had no plans to make a change, planned to start the change in the next 6 months, planned to start in the next 30 days, started making the change in the past 6 months, or had made the change more than 6 months ago. Priority to change was measured in a similar way, with employees indicating the changes that were very important for them to make. Confidence to change was measured by employees marking behavior changes that they were very confident they could make.

**Analysis**

Demographic characteristics, health status, and readiness to change were compared between health coaching and mail program participants to assess for baseline differences. Program impact on health risk status and behavior-specific risk reduction were compared between those who completed the health coaching program and the mail program. For the purposes of this analysis, program completers are defined as those who completed at least three health coaching calls and achieved at least one self-established goal (health coaching) or received six mailings (mail). Participants were included in the outcomes analysis if both baseline and follow-up measures of overall health risk status and behavior-specific risk status were available.

Chi-square and one-way analysis of variance procedures were used to assess between-group differences over time. The criterion for statistical significance was set at $p < .05$. All statistical tests were performed using SPSS, version 17.0 (SPSS Inc., Chicago, Illinois).
The Intervention Process

All employees who completed an HRA and met eligibility criteria specified by their employer and based on their health risk status and stage of change were invited to participate in a health coaching or mail NextSteps behavior change program. Behavior change programs were offered in eight health topic areas, including back care, blood pressure, cholesterol, nutrition/eating habits, physical activity, stress management, tobacco use, and weight control.

Health Coaching Program. Employees self-selected and enrolled into a program based on individualized feedback they received about their health risks and other pertinent factors such as motivation and self-efficacy as reported on their HRA results. The triage process matched each participant with a qualified Health Coach for personalized assistance by telephone. Upon program enrollment, participants engaged in multiple coaching sessions with a qualified Health Coach who facilitated outbound calls to program participants. Health Coaches had a bachelor’s degree or higher in health education, psychology, nursing, dietetics, exercise science, and/or other allied health degree(s) and 3 or more years of professional experience. Newly hired individuals completed several weeks of intensive initial training to qualify as a Health Coach. Ongoing training, mentoring, and continuing education took place throughout the year for all Health Coaches. Health Coaches were matched with participants based on their professional preparation and work experience; for example, Registered Dieticians were matched with participants who wanted to primarily work on nutrition, exercise science professionals were matched with participants who wanted to work on physical activity, and psychology professionals were matched with participants who wanted to work on stress management.

The primary role of the Health Coach was to guide discussion, and support and facilitate behavior change. Health Coaches used a variety of tools, including stress management/resiliency and cognitive behavioral techniques, to engage and guide the participant toward achieving their goal(s). The Health Coach also responded to specific questions and concerns and helped the participant develop an individualized behavior change plan. The program focused on building skills for behavior change and creating a strong support system, as well as facilitating forward movement through the stages of change. An initial mailing occurred after the completion of the first call with the Health Coach. This mailing included a personalized cover letter and a 14-page printed educational booklet on the primary health behavior of interest to the participant. This educational booklet’s focus was primarily on educating the participant on the various stages of change related to his or her health behavior and reinforced the initial and subsequent conversations with the participant’s personal Health Coach. The booklet included a variety of learning activities to guide the participant through the change process.

Key elements of the program included assessment of the participant’s stage of change, reasons for behavior change, previous behavior change attempts, family and social support, and perceived barriers to behavior change. At the start of each call, the Health Coach determined the level of support required to match his or her stage of change, motivation, self-efficacy, perceived barriers, and learning preferences. Coaches helped participants set “SMART” (specific, measurable, achievable, rewarding, and trackable) goals intended to assist them in their health behavior change efforts. SMART goals can be traced back to Edwin Locke’s pioneering research on goal setting and motivation in his article “Toward a Theory of Task Motivation and Incentives” (Locke, 1968). Health Coaches guided each participant to identify and develop SMART goals that were consistent with his or her own personal needs. In addition, all calls between
the Health Coaches and the participant focused on the specific barriers and challenges that arise with meeting goals. The number and timing of calls and call lengths were personalized and tailored depending on each participant’s unique needs. For health coaching participants in this study, the average number of calls completed with a Health Coach was 3.7. Typical duration for each coaching call was approximately 15 minutes.

Mail-Based Program. For individuals who selected the mail-based program, he or she received six personalized, serial monthly mailings of educational materials related to one of the eight health topic areas previously mentioned. Each mailing was tailored to a certain stage of readiness for behavior change. For example, the first mailing of the program was designed for those in the precontemplative stage while the second mailing was designed for those in the contemplative stage. In addition, the general characteristics of a person in each stage of readiness were considered along with the primary tasks and change processes necessary to move through that stage. The type of information, tools, and resources necessary to move through each stage were also considered in the development of the program. For instance, individuals in the precontemplation stage may lack intention to change or may be resistant to change. Thus, the primary task highlighted in the mailing focused on learning more about the issue or behavior while the change processes focused on consciousness-raising and providing the individual with appropriate information to clearly define the program health topic. Tools provided as part of this mailing included a consciousness-raising self-assessment and an assessment of his or her stage of readiness to change. The first five mailings were similarly structured but specifically designed to address one of the five stages of readiness to change. The final mailing included a program evaluation survey and a postage-paid return envelope. In addition, a toll-free telephone number was included with each mailing to allow individuals to call with questions about the content of the educational materials or for requests for additional support and/or materials.

As an example, the weight management series of mailings (in addition to a personalized cover letter with each mailing) included the following:

- Mailing 1: “Healthy Approaches: Weight Control for Life” (13-page booklet); “Weight Management: Fact & Fiction” (1-page fact sheet); and “Why Diets Don’t Work” (1-page fact sheet).
- Mailing 2: “Thinking About My Weight” (8-page booklet); “Weight Management: Overcoming Your Barriers” (1-page fact sheet); and “Tips for Working Parents: Managing Your Time” (1-page fact sheet).
- Mailing 3: “Taking Action: My Weight Management Plan” (8-page booklet); “Eating for a Healthier Heart” (16-page booklet); and “Weight Management: Exercise & Activity” (1-page fact sheet).
- Mailing 4: “Low-Fat Eating” (16-page booklet); “Learning About Serving Sizes” (6-panel brochure); and “Weight Management: Healthy Eating” (1-page fact sheet).
- Mailing 5: “Staying on Track: A Healthy Weight for Life” (8-page booklet); “Weight Management: Take It Off & Keep It Off” (1-page fact sheet); and “Fitness Personal Action Guide” (16-page booklet).
- Mailing 6: “Quick & Easy Low-Fat Cooking” (16-page booklet); “Healthy Eating Out” (6-panel brochure); and “Program Survey Evaluation” (1-page feedback form).

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Baseline demographics and health status comparisons are presented in Table 1. Health coaching participants were slightly older than mail participants (45.3 ± 9.8 years vs. 44.5 ± 10.2 years, \( p = .001 \)), more likely to be female (46.7% vs. 43.3%, \( \chi^2 = 6.671, p = .010 \)), and salaried (50.7% vs. 42.1%, \( \chi^2 = 43.674, p < .001 \)). Self-reported health status was significantly lower among health coaching participants, with almost 53% reporting very poor to good health status compared to 45.4% of mail participants (\( \chi^2 = 29.316, p < .001 \)). In addition, health coaching participants reported having more chronic conditions (71.7% vs. 66.0%, \( \chi^2 = 23.033, p < .001 \)) and greater number of risks at baseline (4.1 ± 1.6 vs. 3.9 ± 1.7, \( p < .001 \)) than mail participants.

With respect to their readiness to make a behavior change, health coaching participants were significantly different than mail participants (Table 2). Among health coaching participants, 55.4% were ready to make a behavior change (Preparation or Action stage) whereas 44.3% of mail participants were ready to make a change (\( \chi^2 = 70.490, p < .001 \)). Compared to mail participants, health coaching participants were also more likely to report being more confident in their ability to change (64.6% vs. 57.0%, \( \chi^2 = 35.732, p < .001 \)) and more motivated to change their health behavior (87.1% vs. 73.1%, \( \chi^2 = 189.905, p < .001 \)). More perceived barriers to change, such as lack of support, lack of time and commitment, were reported among health coaching participants than mail participants (2.9 ± 1.7 barriers vs. 2.3 ± 1.7, respectively, \( p < .001 \)).

Among program completers, researchers found both the health coaching and mail programs to be effective in reducing participants’ health risk status (Table 3). Total
The number of health risks was significantly greater at both baseline and follow-up among health coaching completers than mail completers. Although the difference in number of health risks was significantly greater for health coaching completers (–0.44 ± 1.5) compared to mail completers (–0.31 ± 1.5), both groups achieved high levels of risk reduction (–10.7% vs. –7.8%, respectively).

Many similarities in the level of effectiveness between the health coaching and mail programs were observed, though effectiveness varied somewhat by the health risk area. Health coaching completers achieved significantly greater health risk reduction than mail completers for health risks related to back care, physical activity, stress management, and weight management (Table 4). Specifically, nearly 30% of those in the health coaching program reduced back care risk, whereas 25.3% of those in the mail program reduced back care risk ($\chi^2 = 13.570, p = .001$). Similar differences in risk reduction were observed for physical activity, with 30.4% and 24.6% of health coaching and mail completers reducing risk, respectively ($\chi^2 = 25.077, p < .001$). Health coaching program completers were 20% more likely to reduce both stress risk ($\chi^2 = 15.953, p < .001$) and weight risk ($\chi^2 = 14.883, p = .001$). Tobacco is the risk factor with the least amount of change effects from either of the intervention modalities, with a risk reduction of less than 7%. The health coaching and mail programs showed similar levels of risk reduction among completers for more clinical health risks of blood pressure and cholesterol, as well as for nutrition and tobacco.
Study Findings and Future Research

These findings reiterate those of other studies demonstrating the effectiveness of both mail-based (Grossmeier & Serxner, 2002; Marcus et al., 2007a; Williams, Matthews, Rutt, Napolitano, & Marcus, 2008) and telephone-based health coaching programs (Ash et al., 2006; Gold et al., 2000; Oh et al., 2003; Rabius, Pike, Hunter, Wiatrek, & McAlister, 2007; Vale et al., 2003) in affecting positive health behavior change and in lowering health risks. Much like the present study, a similar study that used health education mailings showed risk decreases of 5% to 25% among the intervention group, with considerable variability in reductions between risk categories such as body weight, exercise, and cholesterol (Fries, Bloch, Harrington, Richardson, & Beck, 1993). Nitzke and colleagues report nutrition risk level changes similar to those we report, though in that study mail-based educational materials and telephone health coaching modalities were combined (Nitzke et al., 2007).

Others have shown that much like the overall and combined effects found in the present study, multiple modalities serve to affect changes in multiple risk factor areas (Fries et al., 1997; Montgomery et al., 1994). Similar to other programs designed to affect multiple risk areas, we too found that weight control was the most difficult risk factor to affect with either program modality (Jeffery et al., 2003; Oh et al., 2003).

Because long-term behavior change is a key to health risk reduction, it is noteworthy that both approaches in the present study produced positive changes that were sustained for an average of 10 months postintervention. Long-term maintenance of behavior has been shown for health coaching in other studies. In a multicenter randomized trial to coach patients with coronary heart disease, Vale and colleagues found that coached patients had significantly greater reductions in total cholesterol than patients in usual care, which consisted of one follow-up contact to schedule an appointment with their medical caregiver, and a chart of risk-factor targets sent to the same medical caregiver. This cholesterol reduction was sustained for 6 months after baseline measurement (Vale et al., 2003). A 2007 review of telephone interventions for physical activity and dietary behavior change showed that such interventions could elicit long-term effects, but that such results were inconsistent between studies and often were found in very specific

Table 4. Health Risk Reduction by Topic Area for Program Completers

<table>
<thead>
<tr>
<th>Health Coaching Program Completers</th>
<th>Mail-Based Program Completers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back care*</td>
<td>818 (29.8)</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>162 (13.0)</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>187 (21.6)</td>
</tr>
<tr>
<td>Nutrition</td>
<td>735 (27.4)</td>
</tr>
<tr>
<td>Physical activity*</td>
<td>839 (30.4)</td>
</tr>
<tr>
<td>Stress management*</td>
<td>657 (23.9)</td>
</tr>
<tr>
<td>Tobacco</td>
<td>184 (6.7)</td>
</tr>
<tr>
<td>Weight management*</td>
<td>257 (9.4)</td>
</tr>
<tr>
<td>Total</td>
<td>2,722</td>
</tr>
<tr>
<td>Percentage</td>
<td>100%</td>
</tr>
</tbody>
</table>

NOTE: Values are n (%).

a. Statistically significantly different between health coaching and mail-based program completers (p < .05).

DISCUSSION
groups of participants (e.g., underactive, postmenopausal women; Eakin et al., 2007). Those authors suggested that behavior maintenance should be a focus of future research.

As the present study is descriptive in nature, the outcomes presented are derived from participants self-selecting into their primary preferred learning modality (health coaching or mail-based) rather than being assigned to an intervention. Accordingly, there is a natural experiment that occurred within the study that provides an opportunity for interpretation. Self-selection introduces bias with its attendant concerns about only attracting the most likely to succeed into interventions. However, participants are likely selecting both the health risk area and learning modality they feel will work best for them. Finding comparable success rates between modalities provides evidence of the appropriateness of an individual’s role in his or her own health behavior change program. Collins and colleagues recently introduced an advanced intervention planner intended to better match populations and interventions (Collins, Murphy, & Strecher, 2007). It may be that comparability in results between modalities is as much a function of preferred participant learning styles than of the relative intensity or independent effectiveness of either modality such as would be identified by expert planning systems. More research is needed concerning the participant’s role in choosing which interventions and modalities serve their needs at various intervals within the change process.

Another factor that may be at work in our results is the so-called healthy user effect or healthy user bias (Humphrey, Chan, & Sox, 2002). Although no simple and succinct definition of this phenomenon could be found, in short the healthy user effect is a form of selection bias in which a person who has a tendency toward healthy behavior is more likely to initiate preventive therapy or adhere to prescribed treatment. This bias has been documented in the effects of influenza immunization in older adults and statin therapy (Brookhart et al., 2007; Eurich, Marrie, Johnstone, & Majumdar, 2008). A recent meta-analysis of observational studies demonstrated an association between therapy adherence and mortality, theoretically a manifestation of the healthy user effect (Simpson et al., 2006). In the present study, the researchers expected that the health coaching program would be shown to be more effective at changing behavior and lowering risks than the mail program. In fact, the results show an unexpected similarity in the risk reduction of health coaching and mail program participants (Table 3). Related to this are differences in the characteristics of the two intervention groups, in that mail program participants had higher self-reported health status and fewer health risks and chronic conditions (Table 1). These measures may indicate an overall higher tendency of mail program participants to engage in healthy behaviors, which may have contributed to the results of the program. However, it may be that the participants who selected the mail program have a self-perceived need for less support and a less intensive intervention. Further research into these possibilities could lead to more effective engagement strategies for telephone and/or mail-based interventions.

The results reported in the present study support the findings of other researchers that health coaching can play a vital role in the disease management process (Vale et al., 2003) as well as in health behavior change (Collins et al., 2007; Gold et al., 2000). These findings also suggest the need for further insight into what level of intensity in alternative modalities can produce outcomes with clinically significant benefits (Young et al., 2007).

The positive results found from this study of participants who self-selected into a modality affirms the results reported by Sherwood and colleagues who suggest that such choice can significantly improve program results (Sherwood et al., 1998). More recent research is divided on this issue, however. A study by Ash et al. concluded that
the benefits from a telephone-based modality outweigh those from mail-based interventions (Ash et al., 2006) whereas Project STRIDE found comparable results between telephone and mail interventions. Clearly, more research is needed on the role of participant choice, especially using control groups, to determine the effect-size differences such choices may produce.

For Practitioners

The differences between health coaching and mail program participants also offer health education practitioners meaningful evidence that varied and robust combinations of learning experiences are needed in worksite settings to meet the diverse needs of a population. That the more intensive health coaching intervention attracted employees with more health risks and lower perceived health status offers a strong rebuttal to those who suggest that it is primarily the healthy or the “worried well” who take advantage of such programs. Health educators should also take note that those who selected the more intensive telephone-based health coaching intervention were older, female, and salaried workers. This may suggest that traditional modalities of educational interventions are not meeting the perceived needs of younger or lower income workers, especially younger men. One need look no further than the extraordinary volume of present-day text messaging and online social networking activity to consider whether telephone-based interventions will increasingly be perceived as irrelevant to the next generation of workers who have yet to develop chronic health problems.

A recent bromide used by some worksite health promotion practitioners is that “engagement drives outcomes.” Although this notion has some face validity given the simple fact that a greater number of participants will likely net a higher yield of positive outcomes, this study offers practitioners a convincing reminder that it is offering the right intervention opportunity to the right participants at the right time that positively influences outcomes. Indeed, practitioners need to be cautious about recruiting high participation for the sake of showing “great engagement” if the interventions offered are not calibrated to the needs of the population. That the present study found that those selecting the more intensive health coaching program also had somewhat higher levels of readiness to change indicates that participants are able to choose for themselves the appropriate learning modality.

Study Limitations

Inherent with observational study designs is the challenge of confidently attributing the level of health improvements observed in the study population to specific intervention attributes because of our inability to account for the many other variables that may have influenced participant health practices during the study period. In addition, we were unable to account for any program engagement that may have occurred prior to the study period that may have affected the overall success of the programs assessed in this study. Nevertheless, using randomization and control groups in an employee population is also fraught with difficulties in both participant recruitment and retention. The present study offers a realistic assessment of program effectiveness in the context of routinely collected data and analysis that is relatively accessible for health education practitioners. Self-reported data can also introduce issues of response bias and reliability. That the results reported between both health coaching and mail participants were derived from the same health assessment partly mitigates this limitation. Moreover, the
HRA has been validated, and the population-level data provided has been stable and consistent across multiple, large comparison groups. Although the 1-year assessment interval is a typical period in which practitioners would be gauging the impact of their programs, the specific duration and intensity of the respective interventions cannot be readily compared given the varying times that each employer group began and completed program offerings during the study period. Accordingly, we cannot account for what level of intensity produced what level of result or what amount of recidivism or behavioral relapse may have occurred during or after this study period. Further study is needed regarding the relationship between intervention intensity and outcomes from mail-based and telephone-based programs in the workplace in order for practitioners to better assess the cost benefit of each approach.

Conclusion

It has been hypothesized that the effectiveness of mail-based programs is due to an increased “dose” of health information compared to telephone interventions (Marcus et al., 2007a). In the present study, it is possible that this is applicable. When written educational materials are sent to the home, as was the case for the mail-based program, they are a constant reminder of healthy behavior and, thus, the dose is increased. It may also be that the mailed materials are able to engage a participant’s family, thus increasing the support for the participant’s healthy behavior change, as well as the dose of the program. Further research is needed to determine the mechanisms by which mail-based programs effect behavior change.

Additional study is needed on the relative contribution various modalities have on recruitment and/or retention of program participants. Researchers have suggested that program outcomes tend to be proportional with the intensity (length, duration) of the modality (McKay, King, Eakin, Seeley, & Glasgow, 2001). However, it may simply be the case that the more participants engage in their learning opportunity of choice, the greater will be the benefits of that intervention (Napolitano et al., 2003). More research is needed concerning how providing participant choices concerning intervention modalities affect outcomes, and what combinations of learning experiences best facilitate sustainable behavior change.

This study helps further demonstrate that mail-based and telephone-based health behavior change programs are effective at reducing health risks. In the context of a comprehensive worksite health promotion program or a community-based health promotion program, one must bear in mind that every individual learns differently. Given this fact, it is important to offer multiple learning modalities in an effort to engage as many individuals as possible in healthy behavior which, in turn, may increase the overall health of a population.

REFERENCES


